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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/685,218	10/14/2003	Shousheng He	P17926US1	4103

27045 7590 12/14/2006

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EXAMINER
ZHENG, EVA Y

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 12/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	**Application No.** 10/685,218	**Applicant(s)** HE, SHOUSHENG	
	Examiner Eva Yi Zheng	**Art Unit** 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20, 22, 23* is/are rejected.

7)☒ Claim(s) *21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 1-10 are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. Claims 1 and 6 may look like method claims, but they do not have practical applications.

4. Claims 22 and 23 are rejected under 35 U.S.C. 101 because they are computer-processing related claimed. Examiner suggests to change "processor instructions" to – computer executable instructions encoded -- or in similar language.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-20, 22 and 23 are rejected under 35 U.S.C. 102(e) as being unpatentable by Arslan et al (US 7,031,411).

a) Regarding to claim 1, Arslan et al disclose a method of reducing interference in a received signal, the method comprising:

performing a synchronization of the received signal to yield a synchronization position (1301 in Fig. 13);

determining an updated received signal using the synchronization position and the received signal, the step of determining the updated received signal comprising iteratively performing interference-model estimation and spatio-temporal whitening (1302,1304 and 1305 in Fig. 13; Col 10, L20-38);

determining an updated synchronization position of the updated received signal (1306 in Fig. 13, which has shown in details in Fig. 9; 901 in Fig.9); and

determining a channel estimate using the updated synchronization position and the updated received signal (1306 in Fig. 13, which has shown in details in Fig. 9; 902 in Fig. 9; Col 9, L29-50).

b) Regarding to claims 2 and 7, Arslan et al disclose further comprising:

providing the channel estimate to an equalizer (DFSE 1305 in Fig. 13);

providing the updated received signal to the equalizer (feedback to DFSE 1305); and

outputting, by the equalizer, of a symbol estimate (soft values in Fig. 13).

c) Regarding to claim 3, Arslan et al disclose wherein the step of determining the updated received signal comprises order adaptation (Fig. 12; Col 9, L60- Col 10, L19) and performing a first-order vector-noise-correlation estimation (Col 5, L55- Col 8, L14).

d) Regarding to claims 4 and 9, Arslan et al disclose wherein symbol extension of the received signal is avoided (whitening filter; 1302 in Fig. 13).

e) Regarding to claims 5 and 10, Arslan et al disclose wherein the method is employed in a single-antenna-interference-rejection application (SAIR; Col 3, L17-19).

f) Regarding to claim 6, Arslan et al disclose a method of reducing interference in a received signal, the method comprising:

performing synchronization and whitening of the received signal (1301 in Fig. 13), the synchronization and whitening comprising performing the following steps at least one time:

performing a synchronization and vector-noise-correlation estimation of an input signal to yield an interference model (SAIR algorithm; Col 5, L55-Col 8, L1);

performing a spatio-temporal whitening operation using the interference model and the input signal to yield an updated received signal (1302,1304 and 1305 in Fig. 13; Col 10, L20-38);

wherein the input signal is the received signal when the step of performing the synchronization and vector-noise-correlation estimation is performed a first time of the at least one time (received signal and sync and SAIR in Fig. 13); and

wherein the input signal is the updated received signal when the step of performing the synchronization and vector-noise-correlation estimation is performed following the first time of the at least one time (1306 in Fig. 13, which has shown in details in Fig. 9; 901 in Fig. 9); and

determining a channel estimate using the updated received signal (1306 in Fig. 13, which has shown in details in Fig. 9; 902 in Fig. 9; Col 9, L29-50).

g) Regarding to claim 8, Arslan et al disclose wherein the step of performing the spatio-temporal whitening operation comprises performing a first-order vector-noise-correlation estimation via synchronization residues (Col 5, L55- Col 8, L14).

h) Regarding to claim 11, Arslan et al disclose an apparatus for reducing interference in a received signal, the apparatus comprising:

means for performing a synchronization of the received signal to yield a synchronization position (1301 in Fig. 13);

means for determining an updated received signal using the synchronization position and the received signal, the means for determining the updated received signal comprising means for iteratively performing interference-model estimation and spatio-temporal whitening (1302,1304,and 1305 in Fig. 13; Col 10, L20-38);

means for determining an updated synchronization position of the updated received signal (1306 in Fig. 13, which has shown in details in Fig. 9; 901 in Fig.9); and means for determining a channel estimate using the updated synchronization position and the updated received signal (1306 in Fig. 13, which has shown in details in Fig. 9; 902 in Fig. 9; Col 9, L29-50).

i) Regarding to claims 12 and 16, Arslan et al disclose further comprising:

means for providing the channel estimate to an equalizer (DFSE 1305 in Fig. 13);

means for providing the updated received signal to the equalizer (feedback to DFSE 1305); and

means for outputting, by the equalizer, of a symbol estimate (soft values in Fig. 13).

j) Regarding to claim 13, Arslan et al disclose wherein the means for determining the updated received signal comprises means for order adaptation (Fig. 12; Col 9, L60-Col 10, L19) and means for performing a first-order vector-noise-correlation estimation (Col 5, L55- Col 8, L14).

k) Regarding to claims 14 and 19, Arslan et al disclose wherein symbol extension of the received signal is avoided (whitening filter; 1302 in Fig. 13).

l) Regarding to claims 15 and 20, Arslan et al disclose wherein the apparatus uses single-antenna-interference-rejection application (SAIR; Col 3, L17-19).

m) Regarding to claim 16, Arslan et al disclose an apparatus for reducing interference in a received signal, the apparatus comprising:

means for performing synchronization and whitening of the received signal (1301 in Fig. 13), the means for synchronization and whitening comprising performing the following steps at least one time:

performing a synchronization and vector-noise-correlation estimation of an input signal to yield an interference model (SAIR algorithm; Col 5, L55-Col 8, L1);

performing a spatio-temporal whitening operation using the interference model and the input signal to yield an updated received signal (1302,1304 and 1305 in Fig. 13; Col 10, L20-38);

wherein the input signal is the received signal when the step of performing the synchronization and vector-noise-correlation estimation is performed a first time of the at least one time (received signal and sync and SAIR in Fig. 13); and

wherein the input signal is the updated received signal when the step of performing the synchronization and vector-noise-correlation estimation is performed following the first time of the at least one time (1306 in Fig. 13, which has shown in details in Fig. 9; 901 in Fig. 9); and

means for determining a channel estimate using the updated received signal (1306 in Fig. 13, which has shown in details in Fig. 9; 902 in Fig. 9; Col 9, L29-50).

n) Regarding to claim 18, Arslan et al disclose wherein the step of performing the spatio-temporal whitening operation comprises performing a first-order vector-noise-correlation estimation via synchronization residues (Col 5, L55- Col 8, L14).

o) Regarding to claim 22, Arslan et al disclose an article of manufacture for reducing interference in a received signal, the article of manufacture comprising:

at least one computer readable medium (ASICS; abstract);

processor instructions contained on the at least one computer readable medium, the processor instructions configured to be readable from the at least one computer readable medium by at least one processor and thereby cause the at least one processor to operate as to:

performing a synchronization of the received signal to yield a synchronization position (1301 in Fig. 13);

determining an updated received signal using the synchronization position and the received signal, the step of determining the updated received signal comprising iteratively performing interference-model estimation and spatio-temporal whitening (1302,1304 and 1305 in Fig. 13; Col 10, L20-38);

determining an updated synchronization position of the updated received signal (1306 in Fig. 13, which has shown in details in Fig. 9; 901 in Fig.9); and

determining a channel estimate using the updated synchronization position and the updated received signal (1306 in Fig. 13, which has shown in details in Fig. 9; 902 in Fig. 9; Col 9, L29-50).

p) Regarding to claim 23, Arslan et al disclose an article of manufacture for reducing interference in a received signal, the article of manufacture comprising:

at least one computer readable medium (ASICS; abstract);

processor instructions contained on the at least one computer readable medium, the processor instructions configured to be readable from the at least one computer readable medium by at least one processor and thereby cause the at least one processor to operate as to:

performing synchronization and whitening of the received signal (1301 in Fig. 13), the synchronization and whitening comprising performing the following steps at least one time:

performing a synchronization and vector-noise-correlation estimation of an input signal to yield an interference model (SAIR algorithm; Col 5, L55-Col 8, L1);

performing a spatio-temporal whitening operation using the interference model and the input signal to yield an updated received signal (1302,1304 and 1305 in Fig. 13; Col 10, L20-38);

wherein the input signal is the received signal when the step of performing the synchronization and vector-noise-correlation estimation is performed a first time of the at least one time (received signal and sync and SAIR in Fig. 13); and

wherein the input signal is the updated received signal when the step of performing the synchronization and vector-noise-correlation estimation is performed following the first time of the at least one time (1306 in Fig. 13, which has shown in details in Fig. 9; 901 in Fig. 9); and

determining a channel estimate using the updated received signal (1306 in Fig. 13, which has shown in details in Fig. 9; 902 in Fig. 9; Col 9, L29-50).

Allowable Subject Matter

7. Claim 21 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eva Y Zheng whose telephone number is 571-272-3049. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eva Yi Zheng
Examiner
Art Unit 2611

December 1, 2006

CHIEH M. FAN
SUPERVISORY PATENT EXAMINER